

## Bibliography

- Ananda, M. P., "Lunar Gravity: A Mass Point Model," *J. Geophys. Res.*, Vol. 82, No. 20, pp. 3049-3064, July 10, 1977.
- Anderson, J. D., Null, G. W., and Thornton, C. T., *The Evaluation of Certain Astronomical Constants from the Radio Tracking of Mariner II*, Technical Report 32-476, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Progr. Astronaut. Aeronaut.*, Vol. 14, 1964.
- Anderson, J. D., *Determination of the Masses of the Moon and Venus and the Astronomical Unit from Radio Tracking Data of the Mariner II Spacecraft*, Technical Report 32-816, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1967.
- Anderson, J. D., et al., "The Radius of Venus as Determined by Planetary Radar and Mariner V Radio Tracking Data," *J. Atmos. Sci.*, pp. 1171-1174, Sept. 25, 1968.
- Anderson, J. D., and Hilt, D. E., "Improvement of Astronomical Constants and Ephemerides from Pioneer Radio Tracking Data," *AIAA J.*, Vol. 7, No. 6, pp. 1048-1054, June 1969.
- Anderson, J. D., "Determination of Astrodynamical Constants and a Test of the General Relativistic Time Delay With S-Band Range and Doppler Data From Mariners 6 and 7," *Space Research*, Vol. XI, pp. 105-112, Akademie-Verlag, Berlin, 1971.
- Anderson, J. D., et al., "Experimental Test of General Relativity Using Time-Delay Data From Mariner 6 and Mariner 7," *Astrophys. J.*, Vol. 200, No. 1, pp. 221-233, Aug. 15, 1975.
- Barnum, P. W., et al., *Tracking and Data System Support for the Mariner Mars 1971 Mission: Orbit Insertion Through End of Primary Mission*, Technical Memorandum 33-523, Vol. III, Jet Propulsion Laboratory, Pasadena, Calif., May 15, 1973.
- Barnum, P. W., and Renzetti, N. A., *Tracking and Data System Support for the Mariner Mars 1971 Mission: Extended Mission Operations*, Technical Memorandum 33-523, Vol. IV, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 15, 1973.
- Barton, W. R., and Miller, R. B., *Tracking and Data System Support for the Pioneer Project: Pioneer 11—Prelaunch Planning Through Second Trajectory Correction: to May 1, 1973*, Technical Memorandum 33-584, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 15, 1975.
- Bartos, K. P., et al., *Implementation of the 64-Meter-Diameter Antennas at the Deep Space Stations in Australia and Spain*, Technical Memorandum 33-692, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 15, 1975.
- Bathker, D. A., *Radio-Frequency Performance of an 85-ft Ground Antenna: X-Band*, Technical Report 32-1300, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1968.
- Bathker, D. A., *Radio Frequency Performance of a 210-ft Ground Antenna: X-Band*, Technical Report 32-1417, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 15, 1969.
- Bathker, D. A., *Predicted and Measured Power Density Description of a Large Ground Microwave System*, Technical Memorandum 33-433, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1971.

- Bathker, D. A., Brown, D. W., and Petty, S. M., *Single- and Dual-Carrier Microwave Noise Abatement in the Deep Space Network*, Technical Memorandum 33-733, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 1, 1975.
- Bathker, D. A., *Microwave Performance Characterization of Large Space Antennas*, JPL Publication 77-21, Jet Propulsion Laboratory, Pasadena, Calif., May 15, 1977.
- Baumert, L., et al., *Coding Theory and Its Applications to Communications Systems*, Technical Report 32-67, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 31, 1961.
- Baumgartner, W. S., *High-Power CW Radar Transmitter*, Technical Report 32-656, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1964.
- Beatty, R. W., and Ootshi, T. Y., "Effect of Discontinuities on the Group Delay of a Microwave Transmission Line," *IEEE Trans. Microwave Theor. Techniq.*, Vol. MTT-23, No. 11, pp. 919-923, Nov. 1975.
- Berman, A. L., *Tracking System Data Analysis Report, Ranger VII Final Report*, Technical Report 32-719, Jet Propulsion Laboratory, Pasadena, Calif., June 1, 1965.
- Berman, A. L., and Rockwell, S. T., *New Optical and Radio Frequency Angular Tropospheric Refraction Models for Deep Space Applications*, Technical Report 32-1601, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 1, 1975.
- Berman, A. L., *The Prediction of Zenith Range Refraction From Surface Measurements of Meteorological Parameters*, Technical Report 32-1602, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1976.
- Biber, K. W., and Whittlesey, A. C., *Description and Analysis of 890-MHz Noise-Measuring Equipment*, Technical Report 32-898, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 31, 1966.
- Born, G. H., et al., "The Determination of the Satellite Orbit of Mariner 9," *Celest. Mech.*, Vol. 9, No. 3, pp. 395-414, May 1974.
- Born, G. H., and Mohan, S. N., "Orbit Determination for Mariner 9 Using Radio and Optical Data," *J. Spacecraft Rockets*, Vol. 12, No. 7, pp. 4392-441, July 1975.
- Brockman, M. H., et al., *Extraterrestrial Radio Tracking and Communication*, External Publication 808, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 12, 1959. Also available in *Proc. IRE*, Vol. 48, 1960.
- Brockman, M. H., and Posner, E. C., *Power Requirements for Deep-Space Telecommunication Links*, Technical Report 32-1395, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Spectrum*, Vol. 6, No. 3, pp. 95-99, Mar. 1969.
- Bunce, R. C., *Unified S-Band Receiver-Exciter Subsystem*, Technical Report 32-809, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1968.
- Butman, S., "A General Formulation of Linear Feedback Communication Systems with Solutions," *IEEE Trans. Inform. Theor.*, Vol. IT-15, No. 3, pp. 392-400, May 1969.
- Butman, S., "Rate Distortion Over Band-Limited Feedback Channels," *IEEE Trans. Inform. Theor.*, Vol. IT-17, No. 1, pp. 110-112, Jan. 1971.

- Butman, S., and Timor, U., "Interplex—An Efficient Multichannel PSK/PM Telemetry System", *IEEE Trans. Commun.*, Vol. COM-20, No. 3, pp. 415–419, June 1972.
- Butman, S. A., "Linear Feedback Rate Bounds for Regressive Channels," *IEEE Trans. Inform. Theor.*, Vol. IT-22, No. 3, pp. 363–366, May 1976.
- Butman, S. A., et al., "Design Criteria for Noncoherent Gaussian Channels With MFSK Signaling and Coding," *IEEE Trans. Commun.*, Vol. COM-24, No. 10, pp. 1078–1088, Oct. 1976.
- Butman, S. A., and Lesh, J. R., "The Effects of Bandpass Limiters on  $n$ -Phase Tracking Systems," *IEEE Trans. Commun.*, Vol. COM-25, No. 6, pp. 569–576, June 1977.
- Cain, D. L., and Hamilton, T. W., *Determination of Tracking Station Locations by Doppler and Range Measurements to an Earth Satellite*, Technical Report 32-534, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 1, 1964.
- Carey, C. N., and Sjogren, W. L., *Gravitational Inconsistency in the Lunar Theory: Confirmation by Radio Tracking*, Technical Report 32-1290, Pt. II, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Science*, Vol. 160, No. 3830, pp. 875–876, May 24, 1968.
- Carpenter, R. L., *Study of Venus by CW Radar—1964 Results*, Technical Report 32-963, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Astron. J.*, Vol. 71, No. 2, pp. 142–152, Mar. 1966.
- Carr, R. E., *The Jet Propulsion Laboratory Method of Tracking Lunar Probes*, External Publication 793, Jet Propulsion Laboratory, Pasadena, Calif., June 4, 1959.
- Chadwick, H. D., and Springett, J. C., "The Design of a Low Data Rate MSFK Communication System," *IEEE Trans. Commun. Technol.*, Vol. COM-18, No. 6, pp. 740–750, Dec. 1970.
- Chaney, W. D., *Final Mariner II Tracking System Data Analysis Report*, Technical Report 32-727, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1965.
- Charles, F. J., and Lindsey, W. C., *Some Analytical and Experimental Phase-Locked Loop Results for Low Signal-to-Noise Ratios*, Technical Report 32-1027, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Proc. IEEE*, Vol. 54, No. 9, pp. 1152–1166, Sept. 1966.
- Christensen, C. S., and Reinold, S. J., "Navigation of the Mariner 10 Spacecraft to Venus and Mercury," *J. Spacecraft Rockets*, Vol. 12, No. 5, pp. 280–286, May 1975.
- Christensen, C. S., et al., "On Achieving Sufficient Dual Station Range Accuracy for Deep Space Navigation at Zero Declination," paper presented at AAS/AIAA Astrodynamics Specialist Conference, Jackson Hole, Wyo., Sept. 7–9, 1977.
- Clark, B. G., et al., "High Resolution Observations of Compact Radio Sources at 13 cm," *Astrophys. J.*, Vol. 161, pp. 803–809, Sept. 1970.
- Clauss, R. C., et al., *Total System Noise Temperature: 15°K*, Technical Report 32-691, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 1964.

- Clauss, R. C., *A 2388-Mc Two-Cavity Maser for Planetary Radar*, Technical Report 32-583, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Microwave J.*, Vol. 8, pp. 74-77, May 1965.
- Clauss, R. C., *A Traveling Wave Maser for Deep Space Communication at 2295 and 2388 MHz*, Technical Report 32-1072, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 15, 1967.
- Clauss, R., Flesner, L. D., and Schultz, S., "Simple Waveguide Reflection Maser with Broad Tunability," *Rev. Sci. Instrum.*, Vol. 48, No. 8, pp. 1104-1105, Aug. 1977.
- Cohen, M. H., et al., "Compact Radio Source in the Nucleus of M87," *Astrophys. J.*, Vol. 158, No. 2, Pt. 2, pp. L83-L85, Nov. 1969.
- A Collection of Articles on S/X-Band Experiment Zero Delay Ranging Tests*, Technical Memorandum 33-747, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 1, 1975.
- Coyner, J. V., Jr., *Radial Rib Antenna Surface Deviation Analysis Program*, Technical Memorandum 33-518, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 15, 1971.
- Curkendall, D. W., and McReynolds, S. R., "A Simplified Approach for Determining the Information Content of Radio Tracking Data," *J. Spacecraft Rockets*, Vol. 6, No. 5, pp. 520-525, May 1969.
- Curkendall, D. W., and Stephenson, R. R., "Earthbased Tracking and Orbit Determination—Backbone of the Planetary Navigation System," *Astronaut. Aeronaut.*, Vol. 7, No. 5, pp. 30-36, May 1970.
- Curkendall, D. W., "Planetary Navigation: The New Challenges," *Astronaut. Aeronaut.*, Vol. 7, No. 5, pp. 26-29, May 1970.
- "The Deep Space Network—An Instrument for Radio Navigation for the Mariner Mission to Mars—1969," *Proceedings of the Second International Conference of STM and AERA*, Reidel Publishing Company, Holland, May 1969.
- Description of the Deep Space Network Operational Capabilities as of January 1, 1966*, Technical Memorandum 33-255, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1966.
- Description of World Network for Radio Tracking of Space Vehicles*, Publication 135, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1958.
- Didday, R. L., and Lindsey, W. C., *Subcarrier Tracking Methods and Communication System Design*, Technical Report 32-1317, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Commun. Technol.*, Vol. COM-16, No. 4, pp. 541-550, Aug. 1968.
- Downs, G. S., and Reichley, P. E., "Observations of Interstellar Scintillations of Pulsar Signals at 2388 MHz," *Astrophys. J.*, Vol. 163, No. 1, Pt. 2, pp. L11-L16, Jan. 1971.
- Downs, G. S., et al., "Mars Radar Observation, A Preliminary Report," *Science*, Vol. 174, No. 4016, pp. 1324-1327, Dec. 24, 1971.
- Downs, G. S., et al., "Martian Topography and Surface Properties as Seen by Radar: The 1971 Opposition," *Icarus*, Vol. 18, No. 1, pp. 8-21, Jan. 1973.

- Downs, G. S., Reichley, P. E., and Morris, G. A., "Pulsar Detections at Frequencies of 8.4 and 15.1 GHz," *Astrophys. J.*, Vol. 181, No. 3, Part 2, pp. L143-L146, May 1, 1973.
- Duxbury, T. C., Johnson, T. V., and Matson, D. L., "Galilean Satellite Mutual Occultation Data Processing," *Icarus*, Vol. 25, No. 4, pp. 569-584, Aug. 1975.
- Easterling, M., *A Long-Range Precision Ranging System*, Technical Report 32-80, Jet Propulsion Laboratory, Pasadena, Calif., July 10, 1961.
- Easterling, M., *Methods for Obtaining Velocity and Range Information from CW Radars*, Technical Report 32-657, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1964.
- Easterling, M., and Goldstein, R., *The Effect of the Interplanetary Medium on S-Band Telecommunications*, Technical Report 32-825, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1965.
- Edelson, R. E. (ed.), *Telecommunications Systems Design Techniques Handbook*, Technical Memorandum 33-571, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1972.
- Edelson, R. E., "An Observational Program to Search for Radio Signals From Extraterrestrial Intelligence Through the Use of Existing Facilities," Preprint IAF-A-76-033, Int. Astronaut. Fed. XXVII Congress, Anaheim, Calif., Oct. 10-16, 1976.
- Edelson, R. E., and Levy, G. S., "The Search for Extraterrestrial Intelligence: Telecommunications Technology," *Proceedings of the 1976 National Telecommunications Conference*, Vol. I, Dallas, Tex., Nov. 29-Dec. 1, 1976.
- Edelson, R. E., "An Experimental Protocol for a Search for Radio Signals of Extraterrestrial Intelligent Origin in the Presence of Man-Made Radio Frequency Sources," paper presented at the XXVIIIth International Astronautical Congress, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977.
- Efron, L., and Solloway, C. B., *Proceedings of the Conference on Scientific Applications of Radio and Radar Tracking in the Space Program*, Technical Report 32-1475, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1970.
- Eimer, M., and Stevens, R., *Tracking and Data Handling for the Pioneer III and Pioneer IV Firings*, External Publication 701, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 14, 1959.
- Esposito, P. B., and Wong, S. K., "Geocentric Gravitational Constant Determined from Mariner 9 Radio Tracking Data," paper presented at the International Symposium on Earth Gravity Models (American Geophysical Union, NASA), St. Louis, Aug. 1972.
- Estabrook, F. B., and Wahlquist, H. D., "Response of Doppler Spacecraft Tracking to Gravitational Radiation," *Gen. Relat. Grav.*, Vol. 6, No. 5, pp. 439-447, Oct. 1975.
- Estacion Espacial de Madrid: Madrid Space Station*, Special Publication 43-26, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 31, 1975.
- Fearey, J. P., and Renzetti, N. A., "Navigation Results on the Mariner Mars Mission to Mars 1969," International Navigation Conference, Hamburg, Oct. 1969.
- Ferrari, A. J., and Ananda, M. P., "Lunar Gravity: A Long-Term Keplerian Rate Method," *J. Geophys. Res.*, Vol. 82, No. 20, pp. 3085-3097, July 10, 1977.

- Fjeldbo, G., Kliore, A. J., and Seidel, B. L., "Bistatic Radar Measurements of the Surface of Mars with Mariner 1969," *Icarus*, Vol. 16, No. 3, pp. 502-508, June 1972.
- Fjeldbo, G., and Eshleman, V. R., "Radio Occultation Measurements and Interpretations," in *The Atmospheres of Venus and Mars*, p. 225, Gordon and Breach, Science Publishers, Inc., New York, N.Y., 1968.
- Fjeldbo, G., "Radio Occultation Experiments Planned for Pioneer and Mariner Missions to the Outer Planets," *Planet. Space Sci.*, Vol. 21, No. 9, pp. 1533-1547, Sept. 1973.
- Flanagan, F. M., et al., *Deep Space Network Support of the Manned Space Flight Network for Apollo: 1962-1968*, Technical Memorandum 33-452, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., July 1970.
- Flanagan, F. M., et al., *Deep Space Network Support of the Manned Space Flight Network for Apollo: 1969-1970*, Technical Memorandum 33-452, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., May 1, 1971.
- Fortenberry, J. W., Freeland, R. E., and Moore, D. M., *Five-Meter-Diameter Conical Furlable Antenna*, Technical Report 32-1604, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1976.
- Fredricksen, H., *Error Correction for Deep Space Network Teletype Circuits*, Technical Report 32-1275, Jet Propulsion Laboratory, Pasadena, Calif., June 1, 1968.
- Gary, B., Olsen, E. T., and Rosenkranz, P. W., "Radio Observations of Cygnus X-3 and the Surrounding Region," *Nature Phys. Sci.*, Vol. 239, No. 95, pp. 128-130, Oct. 23, 1972.
- Gates, C. R., and Johnson, M. S., *A Study of On-Site Computing and Data Processing for a World Tracking Network*, Publication 154, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 9, 1959.
- Georgevic, R. M., *Mathematical Model of the Solar Radiation Force and Torques Acting on the Components of a Spacecraft*, Technical Memorandum 33-494, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 1, 1971.
- Goldstein, R., Stevens, R., and Victor, W. K., *Radar Exploration of Venus: Goldstone Observatory Report for October-December 1962*, Technical Report 32-396, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 1, 1965.
- Goldstein, R. M., *The Analysis of Uncooperative Radar Targets*, Technical Report 32-658, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1964.
- Goldstein, R. M., et al., *The Superior Conjunction of Mariner IV*, Technical Report 32-1092, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 1, 1967.
- Goldstein, R. M., "Radar Time-of-Flight Measurements to Venus," *Astron. J.*, Vol. 73, No. 9, Aug. 1968.
- Goldstein, R. M., et al., "Preliminary Radar Results of Mars," *Radio Sci.*, Vol. 5, No. 2, pp. 475-478, Feb. 1970.
- Goldstein, R. M., and Rumsey, H., "A Radar Snapshot of Venus," *Science*, Vol. 169, Sept. 1970.
- Goldstein, R. M., "Radar Observations of Mercury," *Astron. J.*, Vol. 76, No. 10, pp. 1152-1154, Dec. 1971.

- Goldstein, R. M., Holdridge, D. B., and Lieske, J. H., "Minor Planets and Related Objects: XII. Radar Observations of (1685) Toro," *Astron. J.*, Vol. 78, No. 6, pp. 508-509, Aug. 1973.
- Goldstein, R. M., and Morris, G. A., "Ganymede: Observations by Radar," *Science*, Vol. 188, No. 4194, pp. 1211-1212, June 20, 1975.
- Goldstein, R. M., Green, R. R., and Rumsey, H., Jr., "Venus Radar Images," *J. Geophys. Res.*, Vol. 81, No. 26, pp. 4807-4817, Sept. 10, 1976.
- Golomb, S. W., "New Problems of Space Communications: Part I. Beware of the Tigers," *Astronautics*, Vol. 7, No. 6, p. 19, June 1962.
- Golomb, S. W., "New Problems in Space Communications: Part 3," *Astronautics*, Vol. 7, No. 8, p. 26, Aug. 1962.
- Golomb, S. W., "Ferretting Signals Out of Noise," *Int. Sci. Technol.*, No. 22, pp. 72-82 and 120, Oct. 1963.
- Goodwin, P. S., et al., *Tracking and Data Systems Support for the Helios Project: Project Development Through End of Mission Phase II*, Technical Memorandum 33-752, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1976.
- Gordon, H. J., et al., *The Mariner 6 and 7 Flight Paths and Their Determination From Tracking Data*, Technical Memorandum 33-469, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1970.
- Gottlieb, P., et al., "Lunar Gravity over Large Craters from Apollo 12 Tracking Data," *Science*, Vol. 168, No. 3930, pp. 477-479, Apr. 1970.
- Gray, R. M., and Tausworthe, R. C., "Frequency-Counted Measurements, and Phase Locking to Noise Oscillators," *IEEE Trans. Commun. Technol.*, Vol. COM-19, No. 1, pp. 21-30, Feb. 1971.
- Gubbay, J., et al., "Variations of Small Quasar Components at 2,300 MHz," *Nature*, Vol. 224, No. 5224, pp. 1094-1095, Dec. 1969.
- Gulkis, S., and Gary, B., "Circular Polarization and Total-Flux Measurements of Jupiter at 13.1 cm Wavelength," *Astron. J.*, Vol. 76, No. 1, pp. 12-16, Feb. 1971.
- Gulkis, S., et al., "Observations of Jupiter at 13-cm Wavelength During 1969 and 1971," *Icarus*, Vol. 18, No. 2, pp. 181-191, Feb. 1973.
- Gulkis, S., et al., "An All-Sky Search for Narrow-Band Radiation in the Frequency Range 1-25 GHz," paper presented at the 1976 U.S. National Commission, International Union of Radio Science, Amherst, Mass., Oct. 10-15, 1976.
- Hachenberg, O., et al., "The 100-meter Radio Telescope at Effelsberg," *Proc. IEEE*, Vol. 61, No. 9, pp. 1288-1295, Sept. 1973.
- Hall, J. R., and Easterling, M., "The Technology of Ground Stations in the Deep Space Network from 1958 to 1968," *IEEE Conf. Rec.*, Vol. 4, pp. 576-585, 1968.
- Hall, J. R., et al., "The General Problem of Data Return from Deep Space," *Space Sci. Rev.*, Vol. 8, pp. 595-664, 1968.
- Hall, J. R., *Tracking and Data System Support for Lunar Orbiter*, Technical Memorandum 33-450, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 1970.
- Hamilton, T. W., et al., *The Ranger IV Flight Path and Its Determination From Tracking Data*, Technical Report 32-345, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1962.

- Harris, A. W., et al., "2290-MHz Flux Densities of 52 High-Declination Radio Sources," *Astron. J.*, Vol. 81, No. 4, pp. 222-224, Apr. 1976.
- Hartop, R. W., *Power Loss Between Arbitrarily Polarized Antennas*, Technical Report 32-457, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1964.
- Havens, W. F., et al., *Scan Pointing Calibration for the Mariner Mars 1971 Spacecraft*, Technical Memorandum 33-556, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 1, 1972.
- Heftman, K., and Renzetti, N. A., "Data Return Capabilities of the Deep Space Network in the 1970's," AIAA Paper 67-648, *Proceedings of the AIAA Space Program Issues of the 70's Meeting*, Aug. 1967.
- Higa, W. H., *Low-Level Microwave Mixing in Ruby*, Technical Report 32-1016, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Proc. IEEE*, Vol. 54, No. 10, p. 1453, Oct. 1966.
- Higa, W. H., "Time Synchronization via Lunar Radar," *Proc. IEEE*, Vol. 60, No. 5, pp. 552-557, May 1972.
- Higa, W. H., "Spurious Signals Generated by Electron Tunneling on Large Reflector Antennas," *Proc. IEEE*, Vol. 63, No. 2, pp. 306-313, Feb. 1975.
- Higa, W. H., *The Superconducting Cavity-Stabilized Maser Oscillator*, Technical Memorandum 33-805, Jet Propulsion Laboratory, Pasadena Calif., Dec. 15, 1976.
- Holmes, J. K., "On a Solution to the Second-Order Phase-Locked Loop," *IEEE Trans. Commun. Technol.*, Vol. COM-18, No. 2, pp. 119-126, Apr. 1970.
- Holmes, J. K., "First Slip Times Versus Static Phase Error Offset for the First and Passive Second-Order Phase-Locked Loop," *IEEE Trans. Commun. Technol.*, Vol. COM-19, No. 2, pp. 234-235, Apr. 1971.
- Holmes, J. K., and Tegnalia, C. R., *Digital Command System Second-Order Subcarrier Tracking Performance*, Technical Report 32-1540, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 1, 1971.
- Holmes, J. K., "Performance of a First Order Transition Sampling Digital Phase-Locked Loop Using Random-Walk Models," *IEEE Trans. Commun.*, Vol. COM-20, No. 2, pp. 119-131, Apr. 1972.
- Hurd, W. J., and Anderson, T. O., *Digital Transition Tracking Symbol Synchronizer for Low SNR Coded Systems*, Technical Report 32-1488, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Commun. Technol.*, Vol. COM-18, No. 2, pp. 141-147, Apr. 1970.
- Hurd, W. J., "An Analysis and Demonstration of Clock Synchronization by VLBI," *IEEE Trans. Instr. Meas.*, Vol. IM-23, No. 1, pp. 80-89, March 1974.
- Jacobson, R. A., McDanell, J. P., and Rinker, G. C., "Use of Ballistic Arcs in Low Thrust Navigation," *J. Spacecraft Rockets*, Vol. 12, No. 3, pp. 138-145, Mar. 1975.
- Jaffe, R., and Rehtin, E., *Design and Performance of Phase-Lock Loops Capable of Near-Optimum Performance over a Wide Range of Input Signal and Noise Levels*, Progress Report 20-243, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1954; also available in *IRE Trans. Inform. Theory*, No. 1, pp. 66-67, Mar. 1955.
- Jordan, J. F., "Orbit Determination for Powered Flight Space Vehicles on Deep Space Missions," *J. Spacecraft Rockets*, Vol. 6, No. 5, pp. 545-550, May 1969.

- Jordan, J. F., Melbourne, W. G., and Anderson, J. D., "Testing Relativistic Gravity Theories Using Radio Tracking Data From Planetary Orbiting Spacecraft," *Space Research XIII*, pp. 83-92, Akademie-Verlag, Berlin, 1973.
- Jurgens, R. F., and Goldstein, R. M., "Radar Observations at 3.5 and 12.6 cm Wavelength of Asteroid 433 Eros," *Icarus*, Vol. 28, No. 1, pp. 1-15, May 1976.
- Jurgens, R. F., and Bender, D. F., "Radar Detectability of Asteroids," *Icarus*, Vol. 31, No. 4, pp. 483-497, Aug. 1977.
- Kellerman, K. I., et al., "High Resolution Observations of Compact Radio Sources at 13 Centimeters," *Astrophys. J.*, Vol. 161, No. 3, pp. 803-809, Sept. 1970.
- Kelly, A. J., *Microwave Probe for Plasma Plumes*, Technical Report 32-625, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 1965.
- Kliore, A., Cain, D. L., and Hamilton, T. W., *Determination of Some Physical Properties of the Atmosphere of Mars from Changes in the Doppler Signal of a Spacecraft on an Earth-Occultation Trajectory*, Technical Report 32-674, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 15, 1964.
- Kliore, A., and Tito, D. A., *Radio Occultation Investigations of the Atmosphere of Mars*, Technical Report 32-1157, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *J. Spacecraft Rockets*, Vol. 4, No. 5, pp. 578-582, May 1967.
- Kliore, A., "Radio Occultation Measurements of the Atmospheres of Mars and Venus," in *The Atmospheres of Venus and Mars*, edited by J. C. Brandt and M. B. McElrow, p. 205, Gordon and Breach Science Publishers, Inc., New York, N.Y., 1968.
- Kliore, A. J., et al., "Summary of Mariner 6 and 7 Radio Occultation Results on the Atmosphere of Mars," *Space Research*, Vol. XI, pp. 165-175, Akademie-Verlag, Berlin, 1971.
- Kliore, A. J., et al., "Mariner 9 S-Band Martian Occultation Experiment: Initial Results on the Atmosphere and Topography of Mars," *Science*, Vol. 175, No. 4019, pp. 313-317, Jan. 1972.
- Kliore, A. J., et al., "The Atmosphere of Mars From Mariner 9 Radio Occultation Measurements," *Icarus*, Vol. 17, No. 2, pp. 484-516, Oct. 1972.
- Kliore, A. J., et al., "S Band Radio Occultation Measurements of the Atmosphere and Topography of Mars with Mariner 9: Extended Mission Coverage of Polar and Intermediate Latitudes," *J. Geophys. Res.*, Vol. 78, No. 20, pp. 4331-4351, July 10, 1973.
- Kliore, A. J., "Radio Occultation Exploration of Mars," *Exploration of the Planetary System* (IAU Symposium, No. 65), pp. 295-316, D. Reidel Publishing Co., Dordrecht, Holland, 1974.
- Labrum, R. G., et al., *The Surveyor V, VI, and VII Flight Paths and Their Determination from Tracking Data*, Technical Report 32-1302, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1968.
- Laeser, R. P., et al., *Tracking and Data System Support for the Mariner Mars 1971 Mission: Prelaunch Phase Through First Trajectory Correction Maneuver*, Technical Memorandum 33-523, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 15, 1972.
- Layland, J. W., "On Optimal Signals for Phase-Locked Loops," *IEEE Trans. Commun. Technol.*, Vol. COM-17, No. 5, pp. 526-531, Oct. 1969.

- Layland, J. W., and Lushbaugh, W. A., "A Flexible High-Speed Sequential Decoder for Deep Space Channels," *IEEE Trans. Commun. Technol.*, Vol. COM-19 No. 5, pp. 813-820, Oct. 1971.
- Layland, J. W., "Buffer Management for Sequential Decoding," *IEEE Trans. Commun.*, Vol. COM-22, No. 10, pp. 1685-1690, Oct. 1974.
- Leavitt, R. K., *The Least-Squares Process of MEDIA for Computing DRVID Calibration Polynomials*, Technical Memorandum 33-542, Jet Propulsion Laboratory, Pasadena, Calif., May 15, 1972.
- Lesh, J. R., *Signal-to-Noise Ratios in Coherent Soft Limiters*, Technical Report 32-1589, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1973.
- Lesh, J. R., "Signal-to-Noise Ratios in Coherent Soft Limiters," *IEEE Trans. Commun.*, Vol. COM-22, No. 6, pp. 803-811, June 1974.
- Lesh, J. R., "Sequential Decoding in the Presence of a Noisy Carrier Reference," *IEEE Trans. Commun.*, Vol. COM-23, No. 11, pp. 1292-1297, Nov. 1975.
- Levitt, B. K., "Optimum Frame Synchronization for Biorthogonally Coded Data," *IEEE Trans. Commun.*, Vol. COM-22, No. 8, pp. 1130-1134, Aug. 1974.
- Levitt, B. K., "Long Frame Sync Words for Binary PSK Telemetry," *IEEE Trans. Commun.*, COM-23, No. 11, pp. 1365-1367, Nov. 1975.
- Levy, G. S., Ootoshi, T. Y., and Seidel, B. L., *Ground Instrumentation for Mariner IV Occultation Experiment*, Technical Report 32-984, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1966.
- Levy, G. S., et al., *Lunar Range Radiation Patterns of a 210-Foot Antenna at S-Band*, Technical Report 32-1079, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Antennas Propagation*, Vol. AP-15, No. 2, pp. 311-313, Mar. 1967.
- Levy, G. S., et al., *The Ultra Cone: An Ultra-Low-Noise Space Communication Ground Radio-Frequency System*, Technical Report 32-1340, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Microwave Theor. Tech.*, Vol. MTT-16, No. 9, pp. 596-602, Sept. 1968.
- Levy, G. S., et al., "Pioneer 6: Measurement of Transient Faraday Rotation Phenomena Observed During Solar Occultation," *Science*, Vol. 166, No. 3905, pp. 596-598, Oct. 1969.
- Levy, G. S., et al., "Helios-1 Faraday Rotation Experiment: Results and Interpretations of the Solar Occultations in 1975," *J. Geophys.*, Vol. 42, No. 6, pp. 659-672, 1977.
- Levy, R., "Computer-Aided Design of Antenna Structures and Components," *Comput. Struc.*, Vol. 6, Nos. 4/5, pp. 419-428, Aug./Oct. 1976.
- Levy, R., and McGinness, H., *Wind Power Prediction Models*, Technical Memorandum 33-802, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 15, 1976.
- Lieske, J. H., and Null, G. W., "Icarus and the Determination of Astronomical Constants," *Astron. J.*, Vol. 74, No. 2, Mar. 1969.
- Lieske, J. H., et al., "Simultaneous Solution for the Masses of the Principal Planets from Analysis of Optical Radar and Radio Tracking Data," *Celest. Mech.*, Vol. 4, No. 2, pp. 233-245, Oct. 1971.

- Lindsey, W. C., *Optimum and Suboptimum Frequency Demodulation*, Technical Report 32-637, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1964.
- Lindsey, W. C., *Improvements to be Realized Through the Use of Block-Coded Communication Systems*, Technical Report 32-947, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Aerosp. Electron. Syst.*, Vol. AES-2, No. 3, pp. 364-366, May 1966.
- Lindsey, W. C., *Phase-Shift-Keyed Signal Detection with Noisy Reference Signals*, Technical Report 32-968, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Aerosp. Electron. Syst.*, Vol. AES-2, No. 4, pp. 393-401, July 1966.
- Lindsey, W. C., *A Theory for the Design of One-Way and Two-Way Phase-Coherent Communication Systems: Phase-Coherent Tracking Systems*, Technical Report 32-986, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1969.
- Lindsey, W. C., *Optimal Design of One-Way and Two-Way Coherent Communication Links*, Technical Report 32-988, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Commun. Technol.*, Vol. COM-14, No. 4, pp. 418-431, Aug. 1966.
- Lindsey, W. C., and Charles, F. J., *A Model Distribution for the Phase Error in Second-Order Phase-Locked Loops*, Technical Report 32-1017, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Commun. Technol.*, Vol. COM-14, No. 10, pp. 662-664, Oct. 1966.
- Lindsey, W. C., *Performance of Phase-Coherent Receivers Preceded by Bandpass Limiters*, Technical Report 32-1162, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1967.
- Lindsey, W. C., "Block Coding for Space Communications," *IEEE Trans. Commun. Technol.*, Vol. COM-17, No. 2, pp. 217-225, Apr. 1969.
- Lindsey, W. C., *Block-Coded Communications*, Technical Report 32-1380, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 15, 1969.
- Lindsey, W. C., *Nonlinear Analysis of Generalized Tracking Systems*, Technical Report 32-1453, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Proc. IEEE*, Vol. 57, No. 10, pp. 1705-1722, Oct. 1969.
- Lindsey, W. C., and Simon, M. K., "The Effect of Loop Stress on the Performance of Phase-Coherent Communication Systems", *IEEE Trans. Commun. Technol.*, Vol. COM-18, No. 5, pp. 569-588, Oct. 1970.
- Lindsey, W. C., and Simon, M. K., "Carrier Synchronization and Detection of Polyphase Signals," *IEEE Trans. Commun.*, Vol. COM-20, No. 3, pp. 441-454, June 1972.
- Lindsey, W. C., and Simon, M. K., "L-Orthogonal Signal Transmission and Detection," *IEEE Trans. Commun.*, Vol. COM-20, No. 5, pp. 953-960, Oct. 1972.
- Lindsey, W. C., and Simon, M. K., "On the Detection of Differentially Encoded Polyphase Signals," *IEEE Trans. Commun.*, Vol. COM-20, No. 6, pp. 1121-1128, Dec. 1972.
- Lindsey, W. C., *Synchronization Systems in Communication and Control*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1972.

- Lindsey, W. C., and Tausworthe, R. C., *A Bibliography of the Theory and Application of the Phase-Lock Principle*, Technical Report 32-1581, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 1, 1973.
- Lindsey, W. C., and Simon, M. K., *Telecommunication Systems Engineering*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1973.
- Liu, A. S., and Pease, G. E., "Spacecraft Ranging From a Ground Digitally Controlled Oscillator," *J. Spacecraft Rockets*, Vol. 12, No. 9, pp. 528-532, Sept. 1975.
- Lorell, J., Anderson, J. D., and Sjogren, W. L., *Characteristics and Format of the Tracking Data to Be Obtained by the NASA Deep Space Instrumentation Facility for Lunar Orbiter*, Technical Memorandum 33-230, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1965.
- Lorell, J., Sjogren, W. L., and Boggs, D., *Compressed Tracking Data Used for First Iteration in Selenodesy Experiment, Lunar Orbiters I and II*, Technical Memorandum 33-343, Jet Propulsion Laboratory, Pasadena, Calif., May 1, 1967.
- Lorell, J., and Sjogren, W. L., *Lunar Orbiter Data Analysis*, Technical Report 32-1220, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 15, 1967.
- Lorell, J., *Lunar Orbiter Gravity Analysis*, Technical Report 32-1387, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1969.
- Lorell, J., et al., "Icarus: Celestial Mechanics Experiment for Mariner," *Int. J. Sol. Sys.*, Vol. 12, Jan. 1970.
- Lorell, J., and Laing, P. A., *Compilation of Lunar Orbiter Tracking Data Used for Long-Term Selenodesy*, Technical Memorandum 33-419, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 1, 1970.
- Lorell, J., "Estimation of Gravity Field Harmonics in the Presence of Spin-Axis Direction Error Using Radio Tracking Data," *J. Astronaut. Sci.*, Vol. XX, No. 1, pp. 44-54, Aug. 1972.
- Ludwig, A. C., et al., *Gain Calibration of a Horn Antenna Using Pattern Integration*, Technical Report 32-1572, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 1, 1972.
- Madrid, G. A., et al., *Tracking System Analytic Calibration Activities for the Mariner Mars 1971 Mission*, Technical Report 32-1587, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 1, 1974.
- Martin, D. P., *A Combined Radar-Radiometer With Variable Polarization*, Technical Memorandum 33-570, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 15, 1972., May 15, 1977.
- Martin, W. L., and Zygielbaum, A. I., *Mu-II Ranging*, Technical Memorandum 33-768, Jet Propulsion Laboratory, Pasadena, Calif., May 15, 1977.
- Mathison, R. P., *Tracking Techniques for Interplanetary Spacecraft*, Technical Report 32-284, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 1, 1962.
- McEliece, R. J., *Optimal Communications Nets*, Technical Report 32-697, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1965.
- McNeal, C. E., *Ranger V Tracking Systems Data Analysis Final Report*, Technical Report 32-702, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1965.

- Melbourne, W. G., et al., *Constants and Related Information for Astrodynamical Calculations*, Technical Report 32-1306, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1968.
- Melbourne, W. G., "Planetary Ephemerides," *Astronaut. Aeronaut.*, Vol. 7, No. 5, pp. 38-43, May 1970.
- Melbourne, W. G., "Navigation between the Planets," *Sci. Amer.*, Vol. 234, No. 6, pp. 58-74, June 1976.
- Merrick, W. D., et al., *Deep Space Communications*, Technical Release 34-10, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 29, 1960; also available in *IRE Trans. Mil. Electron.*, Vol. MIL-4, No. 2-3, pp. 158-163, April-June 1960.
- Miller, L., et al., *The Atlas-Centaur VI Flight Path and Its Determination from Tracking Data*, Technical Report 32-911, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1966.
- Miller, R. B., *Tracking and Data System Support for the Pioneer Project: Pioneers 6-9. Extended Missions: July 1, 1972-July 1, 1973*, Technical Memorandum 33-426, Vol. XII, Jet Propulsion Laboratory, Pasadena, Calif., March 1, 1974.
- Miller, R. B., *Tracking and Data System Support for the Pioneer Project: Pioneer 10-From April 1, 1972, Through the Jupiter Encounter Period, January 1974*, Technical Memorandum 33-584, Vol. III, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1975.
- Miller, R. B., et al., *Tracking and Data System Support for the Pioneer Project: Pioneer 10-From January 1974 to January 1975; Pioneer 11-From May 1, 1973 Through Jupiter Encounter Period, January 1975*, Technical Memorandum 33-584, Vol. IV, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1975.
- Moyer, T. D., *Mathematical Formulation of the Double-Precision Orbit Determination Program (DPODP)*, Technical Report 32-1527, Jet Propulsion Laboratory, Pasadena, Calif., May 17, 1971.
- Muhleman, D. O., *Relationship Between the System of Astronomical Constants and the Radar Determinations of the Astronomical Unit*, Technical Report 32-477, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 15, 1964.
- Muhleman, D. O., Goldstein, R., and Carpenter, R., *A Review of Radar Astronomy-Parts I, II*, Technical Report 32-824, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 30, 1966, reprinted from *IEEE Spectrum*, Oct. and Nov. 1965.
- Muhleman, D. O., et al., *JPL Radar Range and Doppler Observations of Venus, 1961-1966*, Technical Report 32-1123, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1968.
- Muhleman, D. O., et al., "Radio Propagation Measurements of the Solar Corona and Gravitational Field: Applications to Mariner 6 and 7," in *Proceedings of the Conference on Experimental Tests of Gravitational Theories*, California Institute of Technology, Pasadena, Calif., Nov. 1970.
- Muhleman, D. O., Esposito, P. B., and Anderson, J. D., "The Electron Density Profile of the Outer Corona and the Interplanetary Medium From Mariner-6 and Mariner-7 Time-Delay Measurements," *Astrophys. J.*, No. 211, No. 3, Part 1, pp. 943-957, Feb. 1, 1977.

- Mulhall, B. D., et al., *Tracking System Analytic Calibration Activities for the Mariner Mars 1969 Mission*, Technical Report 32-1499, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 15, 1970.
- Mulholland, J. D., and Sjogren, W. L., *Lunar Orbiter Ranging Data*, Technical Report 32-1087, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Science*, Vol. 155, No. 3758, pp. 74-76, Jan. 6, 1967.
- Mulholland, J. D., *Proceedings of the Symposium on Observation, Analysis and Space Research Applications of the Lunar Motion*, Technical Report 32-1386, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 1969.
- Muller, P. M., and Sjogren, W. L., *Consistency of Lunar Orbiter Residuals With Trajectory and Local Gravity Effects*, Technical Report 32-1307, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1968.
- Muller, P. M., and Sjogren, W. L., *Mascons: Lunar Mass Concentrations*, Technical Report 32-1339, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Science*, Vol. 161, No. 3842, pp. 680-684, Aug. 16, 1968.
- Muller, P. M., Sjogren, W. L., and Wollenhaupt, W. R., "Lunar Gravity: Apollo 15 Doppler Radio Tracking," *The Moon*, Vol. 10, No. 2, pp. 195-205, June 1974.
- The NASA/JPL 64-Meter-Diameter Antenna at Goldstone, California: Project Report*, Technical Memorandum 33-671, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1974.
- Newburn, R. L., Jr., et al., *Earth-Based Research on the Outer Planets During the Period 1970-1985*, Technical Report 32-1456, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 15, 1970.
- Null, G. W., et al., *Mariner IV Flight Path and Its Determination From Tracking Data*, Technical Report 32-1108, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 1, 1967.
- Ohlson, J. E., "Polarization Tracking of a Partially Coherent Signal Using a Double Loop," *IEEE Trans. Commun.*, Vol. COM-23, No. 9, pp. 859-866, Sept. 1975.
- Ohlson, J. E., and Reid, M. S., *Conical-Scan Tracking With the 64-m-diameter Antenna at Goldstone*, Technical Report 32-1605, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 1, 1976.
- O'Neil, W. J., et al., *The Surveyor III and Surveyor IV Flight Paths and Their Determination From Tracking Data*, Technical Report 32-1292, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 15, 1968.
- O'Neil, W. J., et al., *Mariner 9 Navigation*, Technical Report 32-1586, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 13, 1973.
- Ong, K. M., et al., "A Demonstration of a Transportable Radio Interferometric Surveying System With 3-cm Accuracy on a 307-m Base Line" *J. Geophys. Res.*, Vol. 81, No. 20, pp. 3587-3593, July 10, 1976.
- Otoshi, T. Y., *The Effect of Mismatched Components on Microwave Noise-Temperature Calibrations*, Technical Report 32-1345, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Microwave Theor. Tech.*, Vol. MTT-16, No. 9, pp. 675-686, Sept. 1968.
- Otoshi, T. Y., Stelzried, C. T., and Yates, B. C., "Comparisons of Waveguide Losses Calibrated by the DC Potentiometer, AC Ratio Transformer, and Reflectometer

- Techniques," *IEEE Trans. Microwave Theor. Tech.*, Vol. MTT-18, No. 7, pp. 406-409, July 1970.
- Otoshi, T. Y., and Stelzried, C. T., "A Precision Compact Rotary Vane Attenuator," *IEEE Trans. Micro. Theor. Technique*, Vol. MTT-19, No. 11, pp. 843-854, Nov. 1971.
- Otoshi, T. Y., "Precision Reflectivity Loss Measurements of Perforated-Plate Mesh Materials by a Waveguide Technique," *IEEE Trans. Instr. Meas.*, Vol. IM-21, No. 4, pp. 451-457, Nov. 1972.
- Otoshi, T. Y., and Stelzried, C. T., "Cosmic Background Noise Temperature Measurement at 13-cm Wavelength," *IEEE Trans. Instr. Meas.*, Vol. IM-24, No. 2, pp. 174-179, June 1975.
- Pease, G. E., et al., *The Mariner V Flight Path and Its Determination From Tracking Data*, Technical Report 32-1363, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1969.
- Posner, E. C., *Properties of Error-Correcting Codes at Low Signal-to-Noise Ratios*, Technical Report 32-602, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1964.
- Posner, E. C., "Random Coding Strategies for Minimum Entropy," *IEEE Trans. Inform. Theor.*, Vol. IT-21, No. 4, pp. 388-391, July 1975.
- Potter, P. D., *The Design of a Very High Power, Very Low Noise Cassegrain Feed System for a Planetary Radar*, Technical Report 32-653, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 24, 1964.
- Potter, P. D., Merrick, W. D., and Ludwig, A. C., *Large Antenna Apertures and Arrays for Deep Space Communications*, Technical Report 32-848, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 1, 1965.
- Potter, P. D., *A Computer Program for Machine Design of Cassegrain Feed Systems*, Technical Report 32-1202, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 15, 1967.
- Potter, P. D., et al., *A Study of Weather-Dependent Data Links for Deep Space Applications*, Technical Report 32-1392, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 15, 1969.
- Preston, R. A., "Dual-Spacecraft Radio Metric Tracking," *The Deep Space Network: May and June 1974*, DSN Progress Report, pp. 51-65. Jet Propulsion Laboratory, Pasadena, Calif., Aug. 15, 1974.
- Rechtin, E., "Communication Techniques for Space Exploration," *IRE Trans. Space Electron. Telem.*, Vol. SET-5, No. 3, pp. 95-98, Sept. 1959.
- Rechtin, E., Stevens, R., and Victor, W. K., *Data Transmission and Communications*, Technical Release 34-55, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 30, 1960.
- Rechtin, E., *Space Communications*, Technical Release 34-68, Jet Propulsion Laboratory, Pasadena, Calif., May 1, 1960.
- Rechtin, E., et al., *JPL Range and Doppler System*, Technical Memorandum 33-13, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 22, 1961.
- Rechtin, E., Rule, B., and Stevens, R., *Large Ground Antennas*, Technical Report 32-213, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 20, 1962.

- Rechtin, E., *Lunar Communications*, Technical Memorandum 33-133, Jet Propulsion Laboratory, Pasadena, Calif., June 28, 1963.
- Rechtin, E., "Surprises on Venus," *Int. Sci. Technol.*, No. 20, pp. 13-14, Aug. 1963.
- Rechtin, E., "Long Range Planning for the Deep Space Network," *Astronaut. Aeronaut.*, Vol. 6, No. 1, pp. 28-35, Jan. 1968.
- Reid, M. S., et al., "Low-Noise Microwave Receiving Systems in a Worldwide Network of Large Antennas," *Proc. IEEE*, Vol. 61, No. 9, pp. 1330-1335, Sept. 1973.
- Renzetti, N. A., et al., "Radio Tracking Techniques and Performance of the U.S. Deep Space Instrumentation Facility," *Space Research II, Proceedings of the Second International Space Science Symposium*, Florence, Italy, April 1961, North Holland Publishing Company, Amsterdam.
- Renzetti, N. A., and Ostermier, B. J., *Communications with Lunar Probes*, Technical Report 32-148, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 23, 1961.
- Renzetti, N. A., "DSIF in the Ranger Project," *Astronautics*, Vol. 6, No. 1, pp. 34-37, 70, Sept. 1961.
- Renzetti, N. A., *Tracking and Data Acquisition for Ranger Missions I-V*, Technical Memorandum 33-174, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1964.
- Renzetti, N. A., *Tracking and Data Acquisition for Ranger Missions VI-IX*, Technical Memorandum 33-275, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1966.
- Renzetti, N. A., *Tracking and Data Acquisition Support for the Mariner Venus 1962 Mission*, Technical Memorandum 33-212, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1965.
- Renzetti, N. A., *Tracking and Data Acquisition Report, Mariner Mars 1964 Mission: Near-Earth Trajectory Phase*, Technical Memorandum 33-239, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 1, 1965.
- Renzetti, N. A., *Tracking and Data Acquisition Report, Mariner Mars 1964 Mission: Cruise to Post-Encounter Phase*, Technical Memorandum 33-239, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 1, 1967.
- Renzetti, N. A., *Deep Space Network Support, Atlas/Centaur Missions 1-9*, Technical Memorandum 33-347, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1967.
- Renzetti, N. A., "Tracking and Data Acquisition System for Mariner Missions," *Proceedings of the Seventh International Symposium on Space Technology and Science*, Tokyo, 1967.
- Renzetti, N. A., *Tracking and Data Acquisition Report, Mariner Mars 1964 Mission: Extended Mission*, Technical Memorandum 33-239, Vol. III, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1968.
- Renzetti, N. A., and Fearey, J. P., "The Deep Space Network: An Instrument for the Radio Navigation for the Mariner Mission to Mars 1969," *11th International Conference on Space Engineering*, Venice, Italy, D. Reidel Publishing Co., Dordrecht, Holland, May 1969.

- Renzetti, N. A., *Tracking and Data System Support for Surveyor: Missions I and II*, Technical Memorandum 33-301, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1969.
- Renzetti, N. A., *Tracking and Data System Support for Surveyor: Missions III and IV*, Technical Memorandum 33-301, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1969.
- Renzetti, N. A., *Tracking and Data System Support for Surveyor: Mission V*, Technical Memorandum 33-301, Vol. III, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1969.
- Renzetti, N. A., *Tracking and Data System Support for Surveyor: Mission VI*, Technical Memorandum 33-301, Vol. IV, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1969.
- Renzetti, N. A., *Tracking and Data System Support for Surveyor: Mission VII*, Technical Memorandum 33-301, Vol. V, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1969.
- Renzetti, N. A., *Tracking and Data System Support for the Mariner Venus 67 Mission: Planning Phase Through Midcourse Maneuver*, Technical Memorandum 33-385, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1969.
- Renzetti, N. A., *Tracking and Data System Support for the Mariner Venus 67 Mission: Midcourse Maneuver Through End of Mission*, Technical Memorandum 33-385, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1969.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer VI. Prelaunch to End of Nominal Mission*, Technical Memorandum 33-426, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 1, 1970.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer VII. Prelaunch to End of Nominal Mission*, Technical Memorandum 33-426, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1970.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer VIII. Prelaunch Through May 1968*, Technical Memorandum 33-426, Vol. III, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1970.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer IX. Prelaunch Through June 1969*, Technical Memorandum 33-426, Vol. IV, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 15, 1970.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer VI. Extended Mission: July 1, 1966–July 1, 1969*, Technical Memorandum 33-426, Vol. V, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 1, 1971.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer VII. Extended Mission: February 24, 1967–July 1, 1968*, Technical Memorandum 33-426, Vol. VI, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1971.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer VII. Extended Mission: July 1, 1968–July 1, 1969*, Technical Memorandum 33-426, Vol. VII, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1971.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneer VIII. Extended Mission: June 1, 1968–July 1, 1969*, Technical

- Memorandum 33-426, Vol. VIII, Jet Propulsion Laboratory, Pasadena, Calif., May 1, 1971.
- Renzetti, N. A., *Tracking and Data System Support for the Pioneer Project: Pioneers VI-IX. Extended Missions: July 1, 1969-July 1, 1970*, Technical Memorandum 33-426, Vol. IX, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 15, 1971.
- Renzetti, N. A., and Siegmeth, A. J., *Tracking and Data System Support for the Pioneer Project: Pioneers 6-9. Extended Missions: July 1, 1971-July 1, 1972*, Technical Memorandum 33-426, Vol. XI, Jet Propulsion Laboratory, Pasadena, Calif., May 1, 1973.
- Renzetti, N. A., et al., *Tracking and Data System Support for the Mariner Mars 1969 Mission: Planning Phase Through Midcourse Maneuver*, Technical Memorandum 33-474, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., May 15, 1971.
- Renzetti, N. A., et al., *Tracking and Data System Support for the Mariner Mars 1969 Mission: Midcourse Maneuver Through End of Nominal Mission*, Technical Memorandum 33-474, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1971.
- Renzetti, N. A., Linnes, K. W., and Taylor, T. M., *Tracking and Data System Support for the Mariner Mars 1969 Mission: Extended Operations Mission*, Technical Memorandum 33-474, Vol. III, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1971.
- Renzetti, N. A., *A History of the Deep Space Network: From Inception to January 1, 1969*, Technical Report 32-1533, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 1, 1971.
- Renzetti, N. A., "Radio Communications at Planetary Distances," paper presented at the International Convention on Radio Communication, Rome and Bologna, Italy, Mar. 1974.
- Richter, H. L., Rehtin, E., and Walter, W. K., *National Ground-Based Surveillance Complex (U)*, Publication 146, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 16, 1959 (Confidential).
- Rocci, S. A., "The 210-ft Parabolic Fully Steerable Tracking Antennas for a Deep Space Instrumentation Facility," in *Deep Space and Missile Tracking Antennas*, pp. 50-70, ASME, New York, 1966.
- Rusch, W. V. T., *Phase Error and Associated Cross-Polarization Effects in Cassegrainian-Fed Microwave Antennas*, Technical Report 32-610, Jet Propulsion Laboratory, Pasadena, Calif., May 30, 1965.
- Rusch, W. V. T., and Stelzried, C. T., *Observations of the Lunar Eclipse of December 19, 1964, at a Wavelength of 3.3 MM*, Technical Report 32-1097, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *Astrophys. J.*, Vol. 148, No. 1, pp. 255-259, Apr. 1967.
- Rusch, W. V. T., *Applications of Two-Dimensional Integral-Equation Theory to Reflector-Antenna Analysis*, Technical Memorandum 33-478, Jet Propulsion Laboratory, Pasadena, Calif., May 1, 1971.
- Rusch, W. V. T., "Double Aperture Blocking by Two Wavelength-Sized Feed-Support Struts," *Electron. Lett.*, Vol. 10, No. 15, pp. 296-297, July 25, 1974.

- Sanger, D. K., *Digital Demodulation with Data Subcarrier Tracking*, Technical Report 32-1314, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 1, 1968.
- Siegmeth, A. J., Purdue, R. E., and Ryan, R. E., *Tracking and Data System Support for the Pioneer Project: Pioneers 6-9. Extended Missions: July 1, 1970-July 1, 1971*, Technical Memorandum 33-426, Vol. X, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 15, 1972.
- Siegmeth, A. J., et al., *Tracking and Data System Support for the Pioneer Project: Pioneer 10—Prelaunch Planning Through Second Trajectory Correction December 4, 1969 to April 1, 1972*, Technical Memorandum 33-584, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 1, 1973.
- Simon, M. K., "Nonlinear Analysis of an Absolute Value Type of an Early-Late Gate Bit Synchronizer," *IEEE Trans. Commun. Technol.*, Vol. COM-18, No. 5, pp. 589-596, Oct. 1970.
- Simon, M. K., "Optimization of the Performance of a Digital-Data-Transition Tracking Loop," *IEEE Trans. Commun. Technol.*, Vol. COM-18, No. 5, pp. 686-689, Oct. 1970.
- Simon, M. K., and Lindsey, W. C., "Data-Aided Carrier Tracking Loops," *IEEE Trans. Commun. Technol.*, Vol. COM-19, No. 2, pp. 157-168, Apr. 1971.
- Simon, M. K., "On the Selection of an Optimum Design Point for Phase-Coherent Receivers Employing Bandpass Limiters," *IEEE Trans. Commun.*, Vol. COM-20, No. 2, pp. 210-214, Apr. 1972.
- Simon, M. K., "On the Selection of a Sampling Filter Bandwidth for a Digital Data Detector," *IEEE Trans. Commun.*, Vol. COM-20, No. 3, pp. 438-441, June 1972.
- Simon, M. K., and Springett, J. C., "The Performance of a Noncoherent FSK Receiver Preceded by a Bandpass Limiter," *IEEE Trans. Commun.*, Vol. COM-20, No. 6, pp. 1128-1136, Dec. 1972.
- Simon, M. K., and Springett, J. C., *The Theory, Design, and Operation of the Suppressed Carrier Data-Aided Tracking Receiver*, Technical Report 32-1583, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1973.
- Simon, M. K., and Smith, J. G., "Hexagonal Multiple Phase-and-Amplitude-Shift-Keyed Signal Sets," *IEEE Trans. Commun.*, Vol. COM-21, No. 10, pp. 1108-1115, Oct. 1973.
- Simon, M. K., and Smith, J. G., "Carrier Synchronization and Detection of QASK Signal Sets," *IEEE Trans. Commun.*, Vol. COM-22, No. 2, pp. 98-106, Feb. 1974.
- Simon, M. K., *Data-Derived Symbol Synchronization of MASK and QASK Signals*, Technical Memorandum 33-720, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 15, 1974.
- Simon, M. K., "A Generalization of Minimum-Shift-Keying (MSK) Type Signaling Based Upon Input Data Symbol Pulse Shaping," *IEEE Trans. Commun.*, Vol. COM-24, No. 8, pp. 845-856, Aug. 1976.
- Simon, M. K., "An MSK Approach to Offset QASK," *IEEE Trans. Commun.*, Vol. COM-24, No. 8, pp. 921-923, Aug. 1976.
- Sjogren, W. L., et al., *The Ranger V Flight Path and Its Determination From Tracking Data*, Technical Report 32-562, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 6, 1963.

- Sjogren, W. L., et al., *The Ranger VI Flight Path and Its Determination From Tracking Data*, Technical Report 32-605, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 15, 1964.
- Sjogren, W. L., *The Ranger III Flight Path and Its Determination From Tracking Data*, Technical Report 32-563, Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1965.
- Sjogren, W. L., et al., *Physical Constants as Determined From Radio Tracking of the Ranger Lunar Probes*, Technical Report 32-1057, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 30, 1966.
- Sjogren, W. L., *Proceedings of the JPL Seminar on Uncertainties in the Lunar Ephemeris*, Technical Report 32-1247, Jet Propulsion Laboratory, Pasadena, Calif., May 1, 1968.
- Sjogren, W. L., "Lunar Gravity Estimate: Independent Confirmation," *J. Geophys. Res.*, Vol. 76, No. 29, Oct. 10, 1971.
- Sjogren, W. L., et al., "Lunar Gravity via Apollo 14 Doppler Radio Tracking," *Science*, Vol. 175, No. 4018, pp. 165-168, Jan. 14, 1972.
- Sjogren, W. L., et al., "Gravity Fields," *IEEE Trans. Geosci. Electron.*, Vol. GE-14, No. 3, pp. 172-183, July 1976.
- Slobin, S. D., "Beam Switching Cassegrain Feed System and Its Applications to Microwave and Millimeterwave Radioastronomical Observations," *Rev. Sci. Instr.*, Vol. 41, No. 3, pp. 439-443, Mar. 1970.
- Spier, G. W., *Design and Implementation of Models for the Double Precision Trajectory Program (DPTRAJ)*, Technical Memorandum 33-451, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1971.
- Springett, J. C., *Telemetry and Command Techniques for Planetary Spacecraft*, Technical Report 32-495, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 15, 1965.
- Springett, J. C., and Simon, M. K., "An Analysis of the Phase Coherent-Incoherent Output of the Bandpass Limiter," *IEEE Trans. Commun. Technol.*, Vol. COM-19, No. 1, pp. 42-49, Feb. 1971.
- Stelzried, C. T., *Post-Amplifier Noise Temperature Contribution in a Low-Noise Receiving System*, Technical Report 32-446, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 1964.
- Stelzried, C. T., Reid, M. S., and Petty, S. M., *A Precision DC-Potentiometer Microwave Insertion-Loss Test Set*, Technical Report 32-887, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 15, 1966.
- Stelzried, C. T., Reid, M. S., and Nixon, D., *Precision Power Measurements of Spacecraft CW Signal With Microwave Noise Standards*, Technical Report 32-1066, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 15, 1968.
- Stelzried, C. T., and Reid, M. S., *Precision Power Measurements of Spacecraft CW Signal Level With Microwave Noise Standards*, Technical Report 32-1070, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Instrum. Measurement*, Vol. IM-15, No. 4, pp. 318-324, Dec. 1966.
- Stelzried, C. T., and Rusch, W. V. T., *Improved Determination of Atmospheric Opacity From Radio Astronomy Measurements*, Technical Report 32-1115, Jet

- Propulsion Laboratory, Pasadena, Calif., reprinted from *J. Geophys. Res.*, Vol. 72, No. 9, pp. 2445-2447, May 1, 1967.
- Stelzried, C. T., and Ootshi, T. Y., "Radiometric Evaluation of Antenna-Feed Component Losses," *IEEE Trans. Instrumen. Measurement*, Vol. IM-18, No. 3, pp. 172-183, Sept. 1969.
- Stelzried, C. T., "Precision Microwave Waveguide Loss Calibrations," *IEEE Trans. Instrum. Measurement*, Vol. IM-19, No. 1, pp. 23-25, Feb. 1970.
- Stelzried, C. T., *A Faraday Rotation Measurement of a 13-cm Signal in the Solar Corona*, Technical Report 32-1401, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1970.
- Stelzried, C. T., et al., "The Quasi-Stationary Coronal Magnetic Field and Electron Density as Determined From a Faraday Rotation Experiment," *Sol. Phys.*, Vol. 14, No. 2, pp. 440-456, Oct. 1970.
- Stelzried, C. T., "Operating Noise-Temperature Calibrations of Low-Noise Receiving Systems," *Microwave J.*, Vol. 14, No. 6, pp. 41-46, 48, June 1971.
- Stelzried, C. T., et al., "Transformation of Received Signal Polarization Angle to the Plane of the Ecliptic," *J. Space. Rock.*, Vol. 9, No. 2, pp. 69-70, Feb. 1972.
- Stevens, R., and Victor, W. K., *The Goldstone Station Communications and Tracking System for Project Echo*, Technical Report 32-59, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 1, 1960.
- System Capabilities and Development Schedule of the Deep Space Instrumentation Facility 1963-1967*, Technical Memorandum 33-83, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 2, 1962.
- Tardani, P. A., *Madrid Site Selection Report*, Technical Memorandum 33-149, Jet Propulsion Laboratory, Pasadena, Calif., July 17, 1963.
- Tausworthe, R. C., *A Precision Planetary Range-Tracking Radar*, Technical Report 32-779, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Space Electron. Telem.*, Vol. SET-11, No. 2, pp. 78-85, June 1965.
- Tausworthe, R. C., *Theory and Practical Design of Phase-Locked Receivers*, Technical Report 32-819, Vol. I, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 15, 1966.
- Tausworthe, R., *Cycle Slipping in Phase-Locked Loops*, Technical Report 32-1127, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Commun. Technol.*, Vol. COM-15, No. 3, pp. 417-421, June 1967.
- Tausworthe, R. C., Easterling, M. F., and Spear, A. J., *A High-Rate Telemetry System for the Mariner Mars 1969 Mission*, Technical Report 32-1354, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 1, 1969.
- Tausworthe, R. C., *DSS Subsystem Implementation by Time-Shared Computer*, Technical Memorandum 33-420, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 1, 1969.
- Tausworthe, R. C., "Convergence of Oscillator Spectral Estimators for Counted-Frequency Measurements," *IEEE Trans. Commun.*, Vol. COM-20, No. 2, pp. 213-217, Apr. 1972.
- Tausworthe, R. C., "Simplified Formula for Mean-Slip Time of Phase-Locked Loops With Steady-State Phase Error," *IEEE Trans. Commun.*, Vol. COM-20, No. 3, pp. 331-337, June 1972.

- Tausworthe, R. C., and Crow, R. B., "Improvements in Deep-Space Tracking by Use of Third-Order Loops," *Proceedings of the 1972 International Telemetry Conference, Los Angeles, California, October 10-12, 1972*, pp. 577-583.
- Tausworthe, R. C., *Standard Classifications of Software Documentation*, Technical Memorandum 33-756, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 15, 1976.
- Telecommunications Systems Design Techniques Handbook*, Technical Memorandum 33-571, edited by R. E. Edelson, Jet Propulsion Laboratory, Pasadena, Calif., July 15, 1972.
- Textor, G. P., Kelly, L. B., and Kelly, M., *Tracking and Data System Support for the Mariner Mars 1971 Mission: First Trajectory Correction Maneuver Through Orbit Insertion*, Technical Memorandum 33-523, Vol. II, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1972.
- Thomas, J. B., et al., "A Demonstration of an Independent-Station Radio Interferometry System With 4-cm Precision on a 16-km Base Line" *J. Geophys. Res.*, Vol. 81, No. 5, pp. 995-1005, Feb. 10, 1976.
- Thornton, J. H., Jr., *The Surveyor I and Surveyor II Flight Paths and Their Determination From Tracking Data*, Technical Report 32-1285, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 1, 1968.
- Timor, U., "Equivalence of Time-Multiplexed and Frequency-Multiplexed Signals in Digital Communications," *IEEE Trans. Commun.*, Vol. COM-20, No. 3, pp. 435-438, June 1972.
- Titsworth, R. C., and Welch, L. R., *Power Spectra of Signals Modulated by Random and Pseudorandom Sequences*, Technical Report 32-140, Jet Propulsion Laboratory, Pasadena, Calif., Oct. 10, 1961.
- Titsworth, R. C., *The Algebra of Periodic Sequences*, Technical Report 32-381, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 7, 1963.
- Titsworth, R. C., *Correlation Properties of Cyclic Sequences*, Technical Report 32-388, Jet Propulsion Laboratory, Pasadena, Calif., July 1, 1963.
- Titsworth, R. C., *Optimal Ranging Codes*, Technical Report 32-411, Jet Propulsion Laboratory, Pasadena, Calif., Apr. 15, 1963.
- Titsworth, R. C., *Equivalence Classes of Periodic Sequences*, Technical Report 32-568, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1964, reprinted from *Ill. J. Math.*, Vol. 8, No. 2, June 1964.
- Titsworth, R. C., *The Role of Pseudorandom Codes in Communications*, Technical Memorandum 33-185, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 3, 1964.
- Toukdarian, R. Z., *Final Engineering Report for Goldstone Operations Support Radar*, Technical Memorandum 33-800, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 1, 1976.
- "Tracking and Data Acquisition System for Mariner Missions," *Proceedings of the Seventh International Symposium on Space Technology and Science*, Tokyo, May 1967.
- Truong, T. K., and Reed, I. S., "Convolutions Over Residue Classes of Quadratic Integers," *IEEE Trans. Inform. Theor.*, Vol. IT-22, No. 4, pp. 468-475, July 1976.

- Truong, T. K., and Reed, I. S., "Convolutions over Quartic Integer Residue Classes," *Proceedings of the International Conference on Information Sciences and Systems*, Patras, Greece, Aug. 19-24, 1976.
- Truong, T. K., Liu, K. Y., and Reed, I. S., "Fast Number-Theoretic Transforms for Digital Filtering," *Electron. Lett.*, Vol. 12, No. 24, Nov. 1976.
- Truong, T. K., et al., "X-Ray Reconstruction by Finite Field Transforms," *IEEE Trans. Nucl. Sci.*, Vol. NS-24, No. 1, pp. 843-849, Feb. 1977.
- Truong, T. K., Golomb, S. W., and Reed, I. S., "Integer Convolutions Over the Finite Field  $GF(3 \cdot 2^n + 1)$ ," *SIAM J. Appl. Math.*, Vol. 32, No. 2, pp. 356-365, Mar. 1977.
- Truong, T. K., Reed, I. S., and Liu, K. Y., "Fast Algorithm for Computing Complex Number-Theoretic Transforms," *Electron. Lett.*, Vol. 13, No. 10, pp. 278-280, May 12, 1977.
- Vegos, C. J., et al., *The Ranger IX Flight Path and Its Determination From Tracking Data*, Technical Report 32-767, Jet Propulsion Laboratory, Pasadena, Calif., Nov. 1, 1968.
- Victor, W. K., *Precision Frequency Control—A Communications Requirement of the Space Age*, External Publication 627, Jet Propulsion Laboratory, May 13, 1959.
- Victor, W. K., and Stevens, R., "The Role of the Jet Propulsion Laboratory in Project Echo," *IRE Trans.*, Vol. SET-7, pp. 20-29, Mar. 1961.
- Victor, W. K., Stevens, R., and Golomb, S. W., *Radar Exploration of Venus: Goldstone Observatory Report for March-May 1961*, Technical Report 32-132, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 1, 1961.
- Victor, W. K., Titsworth, R. C., and Rechten, E., *Telecommunication Aspects of a Manned Mars Mission*, Technical Report 32-501, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 20, 1963.
- Viterbi, A. J., *Acquisition Range and Tracking Behavior of Phase-Locked Loops*, External Publication 673, Jet Propulsion Laboratory, Pasadena, Calif., July 14, 1959.
- Viterbi, A. J., *On Coded Phase-Coherent Communications*, Technical Report 32-25, Jet Propulsion Laboratory, Pasadena, Calif., Aug. 15, 1960.
- Viterbi, A. J., *Classification and Evaluation of Coherent Synchronous Sampled-Data Telemetry Systems*, Technical Report 32-123, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1961.
- Viterbi, A. J., *Phase-Locked Loop Dynamics in the Presence of Noise by Fokker-Planck Techniques*, Technical Report 32-427, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 29, 1963; also reprinted in *IEEE Proc.*, Vol. 51, No. 12, pp. 1737-1753, Dec. 1963.
- Viterbi, A. J., *Orthogonal Tree Codes for Communication in the Presence of White Gaussian Noise*, Technical Report 32-1120, Jet Propulsion Laboratory, Pasadena, Calif., reprinted from *IEEE Trans. Commun. Technol.*, Vol. COM-15, No. 2, pp. 238-242, Apr. 1967.
- von Roos, O. H., Yip, K. B. W., and Escobal, P. R., "A Global Model of the Earth's Ionosphere for Use in Space Applications," *Astronautica Acta*, Vol. 18 (Supplement), No. 3, pp. 215-232, Aug. 1974.

- Weber, W. J., III, "Performance of Phase-Locked Loops in the Presence of Fading Communication Channels," *IEEE Trans. Commun.*, Vol. COM-24, No. 5, pp. 487-499, May 1976.
- Weber, W. J., III, Ackerknecht, W. E., and Kollar, F. J., *Viking X-Band Telemetry Experiment Final Report*, Technical Memorandum 33-794, Jet Propulsion Laboratory, Pasadena, California, Sept. 1, 1976.
- Winn, F. B., "Selenographic Location of Surveyor VI," in *Surveyor VI Mission Report: Part II. Science Results*, Technical Report 32-1262, Jet Propulsion Laboratory, Pasadena, Calif., Jan. 10, 1968.
- Winn, F. B., "Post Landing Tracking Data Analysis," in *Surveyor VII Mission Report: Part II. Science Results*, Technical Report 32-1264, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 15, 1968.
- Winn, F. B., "Surveyor Post-Touchdown Analysis of Tracking Data," in *Surveyor Project Final Report: Part II. Science Results*, Technical Report 32-1265, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1968.
- Winn, F. B., *Surveyor Posttouchdown Analyses of Tracking Data*, NASA SP-184, National Aeronautics and Space Administration, Washington, D.C., p. 369.
- Wollenhaupt, W. R., *Tracking System Data Analysis Report, Ranger 4 Final Report*, Technical Report 32-523, Jet Propulsion Laboratory, Pasadena, Calif., Mar. 1, 1964.
- Wollenhaupt, W. R., et al., *The Ranger VII Flight Path and Its Determination From Tracking Data*, Technical Report 32-694, Jet Propulsion Laboratory, Pasadena, Calif., Dec. 15, 1964.
- Wong, S. K., and Reinbold, S. J., "Earth-Moon Mass Ratio From Mariner 9 Radio Tracking Data," *Nature*, Vol. 241, No. 5385, pp. 111-112, Jan. 12, 1973.
- Woo, R., and Ishimaru, A., "Remote Sensing of the Turbulence Characteristics of a Planetary Atmosphere by Radio Occultation of a Space Probe," *Radio Sci.*, Vol. 8, No. 2, pp. 103-108, Feb. 1973.
- Woo, R., et al., *Effects of Turbulence in the Atmosphere of Venus on Pioneer Venus Radio-Phase I*, Technical Memorandum 33-644, Jet Propulsion Laboratory, Pasadena, Calif., June 30, 1973.
- Woo, R. T., "Observations of Turbulence in the Atmosphere of Venus Using Mariner 10 Radio Occultation Measurements," *J. Atmos. Sci.*, Vol. 32, No. 6, pp. 1084-1090, June 1975.
- Yuen, J. H., "A Double-Loop Tracking System," *IEEE Trans. Commun.*, Vol. COM-20, No. 6, pp. 1142-1150, Dec. 1972.
- Yuen, J. H., *A Practical Statistical Model for Telecommunications Performance Uncertainty*, Technical Memorandum 33-732, Jet Propulsion Laboratory, Pasadena, Calif., June 15, 1975.